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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the Du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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The Market For Quality

An Editorial

Individual food consumption in the United States may be approaching its upper limit. After all, people can eat just so much and no more. Food consumption has increased at a phenomenal rate in recent years. The average American today eats about 14 per cent more than he did before World War II.

This abundance of food is in itself a unique situation. In all of history, mankind has devoted his major energies to the struggle for enough food to survive. Right now, millions of people throughout the world are still critically short of basic food requirements.

The gain in this country, however, has been far more than just a change in quantity. An equally important shift is taking place in the composition of the diet and in the general quality of foods. The starch-rich dinner table of the past has given way to lighter foods rich in meat proteins. Per capita consumption of proteins, bolstered by bigger paychecks, has responded particularly rapidly to the changes in consumer tastes. There has been an increase of almost one third in meat eating since before the war.

Significantly, the rise in meat consumption has been concentrated largely on the most expensive product of all, beef. Pork has shown virtually no change since 1929, while total beef production has gone up over 120 per cent since that time. Incidentally, per capita potato consumption is down about 60 per cent since the 1920's.

Even more striking has been the growing emphasis on the quality of products that find their way into the market basket of the average housewife. "Choice" beef, which averaged about 38 per cent of the market in the 20's, now accounts for almost 60 per cent. Consumption of "good" and "commercial" grades has been cut in half, while "utility" beef, once amounting to 10 per cent of beef sales, has almost vanished from butcher's meat cases.

Grocers' shelves also tell an eloquent story of quality and convenience. Processed foods of many varieties, prepared mixes, frozen and canned products, and concentrates now have over two and a half times the market they held a short five years ago, while regular items have remained unchanged. Experts credit much of the 70 per cent increase in per capita eating of chicken since the prewar period to the convenience introduced by processing.

All this means that the farms of the future will increasingly have to adjust their production to meet quality requirements and taste changes of consumers. The growing living standard of the average American offers many opportunities for profit to farmers who are alert to the developing market situation.

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KEEPERS OF FREEDOM

By Clark W. Davis
Chairman, Sponsoring Committee
Future Farmers of America Foundation*

The American farmer today must meet some of the most exacting standards that exist in any career or profession in the world. It's no longer enough for a farmer to have a strong back, skillful hands, a knack with horses or mules, and a natural instinct for knowing weather, soil, crops, and livestock. A farm is one of the best places to put a good education to work. In preparing yourselves to be American farmers, you have learned shop skills and engineering. You have acquired a knowledge of the scientific principles of fertilization, pest control, selection of crop varieties, and the care, feeding, and breeding of livestock.

American farmers have become so productive that only about 13 per cent of the total population live on farms -- producing enough farm products for America, and our export markets, and surpluses besides. It is the productivity of American agriculture which has made it possible for more and more people to work in business and industry -- producing labor-saving farm equipment, automobiles and television sets, which bring us all closer together, and all the other necessities and comforts of our modern standard of living.

In contrast to other fields of endeavor, what does farming offer you? First of all, with good commercial management of your farm enterprise, you can enjoy at least as good a standard of living as city people. You have the immense satisfaction that comes from continually working with living organisms, from the tiniest seed to the most ornery bull. You spend a great deal of time out-of-doors, and see the seasons change from day-to-day. It would be presumptuous of me to try to list for you all the satisfactions of living on a farm.

But I want to point out to you just one aspect of farm life which seems to me the greatest opportunity in agriculture -- and perhaps it is the reason why America looks to farm families for four out of five of its leaders in every field. In farming you probably enjoy the greatest degree of individual freedom of thought and action which remains in the world. In one sense, you are keepers of this freedom. A farmer operates on his own, exercising his own judgment, making his own decisions, taking his own risks, and sharing the rewards with his own family.

And let us never forget that American progress has come about because we have always given the widest possible

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*Excerpts from remarks made by Mr. Davis, general manager of Du Pont's Grasselli Chemicals Department, on October 17, 1956 at the National FFA Convention.

scope to individual achievement in an atmosphere in which each individual is encouraged to give his best. The great advances in science and in thought have come about through the efforts of individual people -- people who perhaps struggled against the current of their times and who had the vigor, imagination and initiative to question traditional ways of doing things.

Too many of our schools seem to be teaching us that we can do our best if we try to be like everyone else. The man with big ideas stands out from a group -- he is different. Sometimes we make him a displaced person, because we do not recognize what makes him different. Then as he comes into his own, we finally understand him. Nearly every phase of twentieth century living requires group effort to perform its increasingly complex tasks. But it also requires individual genius and accomplishment if we are to go on to greater spiritual understanding and material well-being.

Today, with a United States population of 167 million people, four and three-quarter million farms are producing enough to create agricultural surpluses. But when you boys reach middle age, we may have a population of 220 million people, and today's output may not be enough. With a free farm economy, I don't think today's surplus and tomorrow's demand present an impossible problem. I believe that with scientific advancement and good business management, American farmers will meet this challenge just as they have met challenges in the past.

If we had this situation in industry, we might say we will need this production capacity in the years ahead. Let's put our efforts into reducing production costs, assuring maximum safety in our operations, remodeling and modernizing our facilities.

Above all, we would say: "Let's dream a little." The experience and ideas of our good men are valuable for the future. We need the ideas and initiative of our gifted individuals -- of exceptional men.

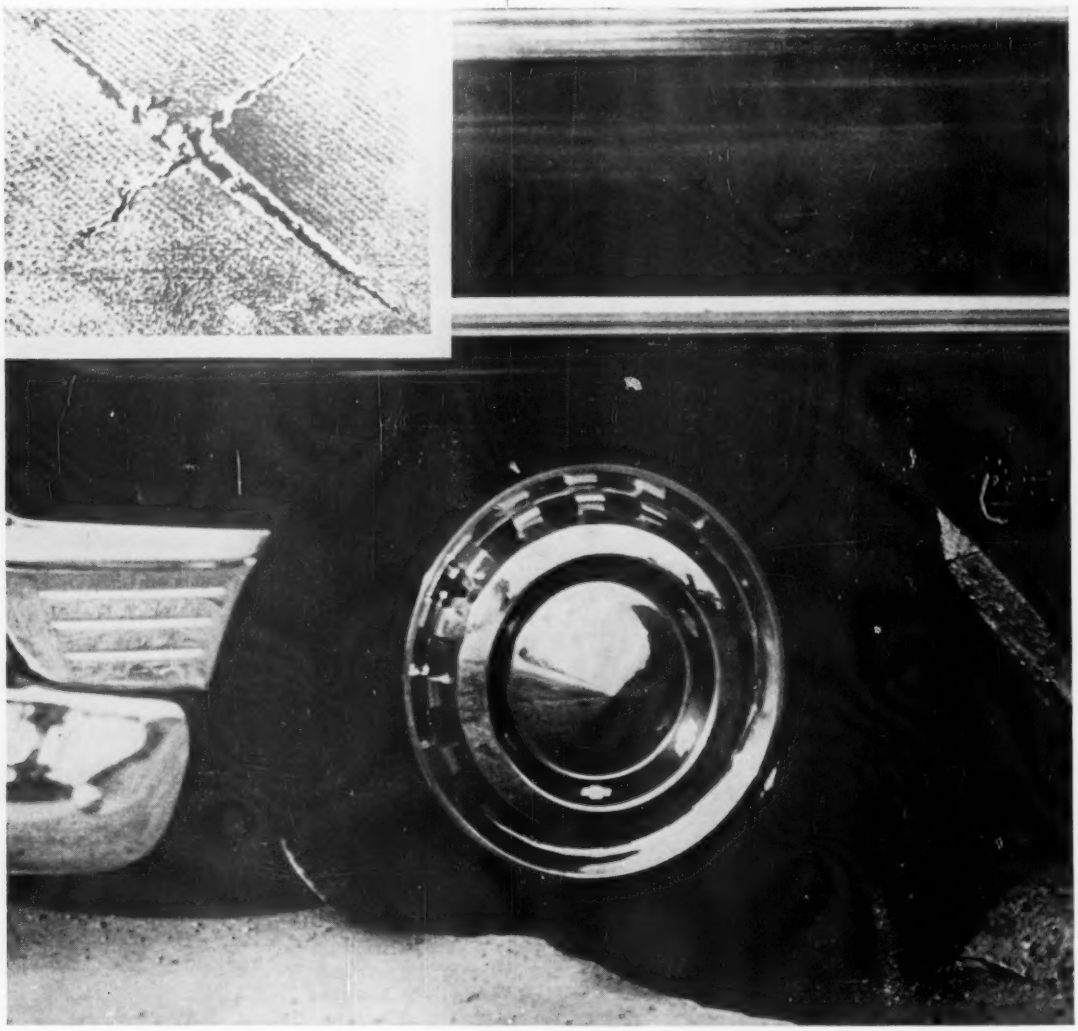
Someone has said: "One machine may do the work of 50 ordinary men, but no machine can do the work of one exceptional man." You boys represent the exceptional men of American agriculture. Somewhere among you tonight there may be one who is nursing an idea in his mind -- an idea that will come into focus while you're rounding up your steers, or picking your apples, or waiting for your turn on the irrigation line.

Each of you has about the same number of brain cells as Thomas Edison, or Alexander Graham Bell, or Abraham Lincoln -- or any other great man in history or contemporary times. The challenge to you is whether you are content to be an ordinary individual, or whether you can make the most of your opportunity to be exceptional.

NYLON CORD MAKES BETTER TIRES FOR FARM AND RANCH

Improved performance and greater economy are the result when tires made with durable nylon cord are used on farm and ranch. Tests on fleets of trucks and passenger cars show nylon-cord tires wear longer, with fewer punctures or breaks, than tires made with conventional fibers.

The tire cord that can withstand the gruelling impact of heavy bomber landings is ideal for use whenever going is rough. It resists the wear and tear of rocky fields. Jeeps and trucks used to check feed and water on the range run safer and longer on nylon-cord tires.



NYLON CORD tire resists impact of chuck hole. Inset above shows cut made by same blow in conventional tire. Because nylon cord retains carcass strength, tires can be repeatedly retreaded.

Because of nylon's toughness and resiliency, tire carcasses retain their original strength and can be repeatedly retreaded, long after ordinary tires must be discarded. Nylon tires subjected to constant hard use have been retreaded as many as seven times, without significant increase in failure, for a total running life of more than 100,000 miles. Conventional tires, on the other hand, have shown a high rate of failure after the second retreading.

The reasons why 50 million pounds of nylon were consumed by tire manufacturers last year are as follows:

1. Nylon's strength helps tires resist bruises and impacts such as are found on country roads or difficult terrain. They ride over rocks, ruts, and other obstructions with much less chance of damage or blowout.

2. Nylon resists extremes of temperature and weather. It retains its full strength on hot country roads and the cord will not suffer from moisture or damp earth. Even when there are cuts which expose the cord, nylon will not rot.

3. Nylon permits construction of lighter tires that run cooler, helping preserve tire rubber.

4. Heavy loads encountered in farm vehicles do not weaken nylon cord.

To make a conclusive test of the durability of nylon tires, the Du Pont Company organized a significant endurance test in cooperation with a local taxicab company. Thirty-four cars were equipped with nylon-cord tires and an equal number with conventional tires. The test has now run almost two years and every one of the conventional tires has failed within that time, a majority of them because of deficiency in the cord.

About 70 per cent of the nylon tires are still giving good service after many thousands of miles of driving in all weather conditions and over all kinds of terrain. The nylon tires averaged 4.3 retreads and those still in service have had a minimum of five (some up to seven) retreads. The average on conventional tires was only two.

So far, the nylon-cord tires have shown a 73 per cent greater active life and the final results will be much higher, since almost three-fourths of the nylons are still on the job. The cost saving by the use of nylon-cord tires has been 12.7 per cent.

HUNTING SEASON IS HERE AGAIN:
DON'T BE THE TARGET THIS YEAR

With the hunting season here again, a few carefully followed safety rules may mean the difference between a festive game dinner and a tragedy. At least 95 per cent of all hunting accidents can be prevented if everyone follows this simple rule: "Treat every gun with the respect due to a deadly weapon."

Many a farmer with "Sunday hunters" visiting from the city or a youngster going out shooting for the first time will want to point out a few simple life-saving precautions, including the following:

Never point a gun at anyone; never indulge in horse-play with guns; never leave a loaded gun unattended; never lay a gun down with the muzzle pointing at a person; never pass a gun across or under fences while looking into the business end of the barrel.

Before loading a gun, make sure the barrel and action are free of dirt or other obstruction that may cause it to blow up. Don't shoot on impulse or at sounds, but wait until you see clearly that your sight is pointing at game, not people or farm animals. Don't carry a loaded gun in your car or truck.

Do be careful! Don't be the target.

"Let's Go Shooting." illustrated color cartoon book containing many safety hints and other valuable information on hunting, conservation, and "how to" information on shooting ranges, is available free of charge from the Advertising Division, Remington Arms Company, Inc., Bridgeport, Connecticut.

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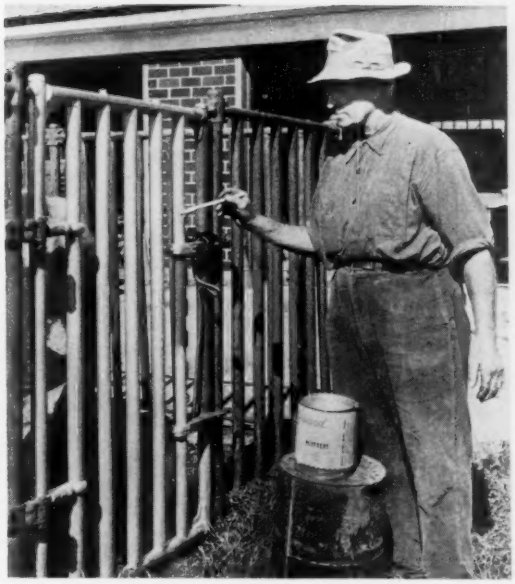
Defective or overheated stoves and furnaces are the biggest single factor in causing an annual loss of more than $150 million in farm fires, according to William E. Larsen, agricultural safety engineer at the University of Delaware. Careless use of gasoline or kerosene, defective chimneys and flues, sparks from chimneys, electrical fires, lightning, smoking, and children playing with matches are other important causes of fire on the farm.

# # # # #

Forty million pounds of nylon for tire cords and fabrics, as well as other uses, will be produced annually to meet growing demands when the Du Pont Company's new plant at Richmond, Va., is completed. The decision to build the new facility, the Company announced, "reflects our confidence that nylon markets will continue to expand." Du Pont already has a rayon plant at the Richmond site.

FARM IMPLEMENTS and other metal equipment coated with neoprene paint resist abrasion and weathering.



METAL FENCES, railings, watering equipment, as well as wooden buildings are protected with neoprene paint.

LIQUID NEOPRENE FORMS TOUGH PROTECTIVE COATING ON FARM FACILITIES AND MACHINES

Liquid neoprene synthetic rubber, which applies as easily as paint and comes in assorted colors, has been developed to give a durable protective coating to farm buildings, equipment, and machinery. The new product bonds firmly to almost any clean surface -- wood, metal, masonry, glass, fabric -- and hardens into a tough film that protects against weather, temperature, scuffing, solvents, oils, alkalis, acids, and fertilizers. Because the neoprene coat remains flexible, it will not chip or flake as a result of temperature changes and vibration.

Virtually everything susceptible to corrosion, such as machinery, metal buildings, fencing, watering tanks, irrigation piping, ventilators, stanchions, can be given long-lasting rust protection. Since the neoprene can be easily applied with brush, spray,or roller, it is an ideal farm maintenance product.

One application usually stops leaks on roofs made of metal, wood, or composition shingles. Waterproofing can also be provided by coating tarpaulins and other fabrics. The useful life of rubber and leather goods, including harness, belting, hose, and footwear, can be greatly extended by neoprene coating. Slippery concrete floors can be skid proofed by scattering sand or grit over a fresh coat of neoprene.

PROBLEMS OF FARMING, SOIL, WEATHER, AND WASTE ARE MAJOR FRONTIERS OF SCIENCE AND INVENTION

Some of the great unconquered frontiers of science are on the farm. Although man has made notable progress in 10,000 years of research and exploration, he has discovered more questions than answers. While the scientist has greatly reduced the area of the unknown, he has been able to find only partial solutions for some of the world's most critical problems. He is still searching for ways of controlling insects, eliminating diseases of animals and men, reducing the waste of rot and corrosion, and protecting the works of man against the ravages of nature.

Unsolved problems of science are numerous and they become increasingly more complex. The need for scientific study and invention, for new processes and techniques, is vital to future progress.

As the population of the world rises, for example, food needs become more pressing. Insects that have destroyed the food supplies of entire nations have been held in partial check by chemistry, but the problem itself is still great. It is estimated that the U. S. alone, despite the most modern insect control system, still suffers annual losses of $4 billion from insects.

Another $10 billion is lost each year through the spoilage and waste of food products. Much of the loss comes during transportation and storage, part through crop losses from weeds. Means of retarding waste through control chemicals, irradiation and packaging will help increase needed food supplies in the future.

Floods and other ravages of nature kill many people each year and destroy vast amounts of property, including cropland. Scientific discovery of means of controlling weather could eliminate such disasters as floods, hurricanes, tornadoes,

FIRE-RESISTANT PAINT would help cut fires, which now take 11,000 lives a year, cause $870 million damage.

UNBREAKABLE PAVEMENT would cut auto wear and tear, reduce the annual $2 billion road repair bill.

RUN-PROOF STOCKINGS with stylish appearance would please women, who buy 700 million pairs yearly.

PLAGUES like swarm of destructive locusts above, raise havoc with food supply, cost U. S. alone an estimated $4 billion a year in crop losses, depress other areas which might otherwise be prosperous agricultural belts. Chemicals help control losses, but there are some 80,000 different kinds of pests in the U.S., 7000 injurious to crops, and so far man has not completely eradicated even one species of them.

and droughts. The ability to create rainfall alone would make fertile millions of acres of land in this country.

Rust and rot, which attack virtually everything used in home or farm, including machinery, buildings, and installations, take an estimated toll of $10 billion each year. Development of corrosion resistant metals and products as well as improved protective coatings is an important assignment of the modern chemist.

Here are others in a broad range of needs: Fire resistant paint would be a particularly important boon for farmers isolated from city fire-fighting facilities. Unbreakable pavements would help provide better transportation on country roads cracked by trucks and farm machines. (Few things would help make the housewife happier than a pair of stylish nylon stockings that are completely run proof.)

This is a small part of the long list of problems which science must unravel in order to provide the continuing progress which has characterized the modern world. Each step toward the solution will help conserve a vast quantity of our human and physical resources.

But these problems can be solved only if the nation maintains a social and economic climate conducive to science and development, one which encourages industrial organizations to assume the huge risks of finding, developing and marketing new products.

"TEST TUBE" RUMEN PROVIDES EFFICIENT MEANS OF TESTING FEED SUPPLEMENTS

A cluster of shiny glass bottles and a maze of tubing in Du Pont's Experimental Station near Wilmington, Del., provide research scientists an efficient and inexpensive tool for the study of feeds and feed supplements for cattle or other ruminant animals.

This equipment performs in the laboratory the functions of the rumen, or first stomach, of animals. It permits the testing of new feeding ideas and new supplemental products with laboratory accuracy under completely controlled conditions before they are tried on live animals and put on the market.

Science is able to reproduce rumen conditions in the laboratory because the paunch is essentially a fermentation vat surrounded by an animal body. Instead of digestive juices, the rumen contains bacteria and other micro-organisms which chemically prepare food for the digestive process. The body of the animal provides only control and transport functions to keep the fermentation process going. It maintains proper temperature and anaerobic conditions, and provides a steady supply of raw materials, plus a means of removing the end product of fermentation.

What Du Pont researchers have done is to reproduce all of these conditions in laboratory vessels. Rumen contents obtained from live animals provide the necessary bacteria. Temperature is controlled by electrical means; exclusion of air reproduces anaerobic conditions in the paunch; and, gentle agitation prevents any localized buildup of end products. Raw materials fed into the artificial rumen undergo the same changes that occur in the actual animal. Normally, material to be tested is kept in the artificial rumen for 24 to 72 hours, after which the contents are analyzed to determine the changes that have taken place in the test material through bacterial action.

Bacteria for the artificial rumen are obtained from live animals. A simple veterinary operation makes a fistula or "window" in the hide of cows and into the rumen. Necessary samples are taken through the opening. In order to keep the rumen functioning properly, this hole is closed with an easily removable stopper or plug made of nylon and "Lucite" acrylic resin. The animal feels no discomfort from the fistula and is compensated for the inconvenience by being kept out of the slaughterhouse indefinitely.

One of the important advantages of using the artificial rumen is the relatively small cost. The big expense in cattle feeding trials is the price of animals and the cost of maintaining them over the long periods of time needed to obtain conclu-

sive feeding results. Use of artificial rumens allows researchers to use only one cow for bacteria culture source and then carry out many evaluation tests and analyses on a large variety of treatments.

The artificial rumen has provided much scientific information to researchers and farmers. By this technique, scientists have been able to follow the conversion of non-protein nitrogen to amino acids, the change from cellulose and starches to high-energy, short-chain fatty acids. The advantage lies in the fact that the end products are not being removed, as in the animal, and the results can be carefully analyzed. More practically, it has allowed researchers to roughly evaluate proposed rations as to cellulose digestibility, utilizable protein, and other factors. Naturally, the artificial rumen is subject to eventual confirmation by the final arbiter, the living animal.

ONE-FIFTH OF U. S. STOCKHOLDERS LIVE IN RURAL AREAS AND ON FARMS

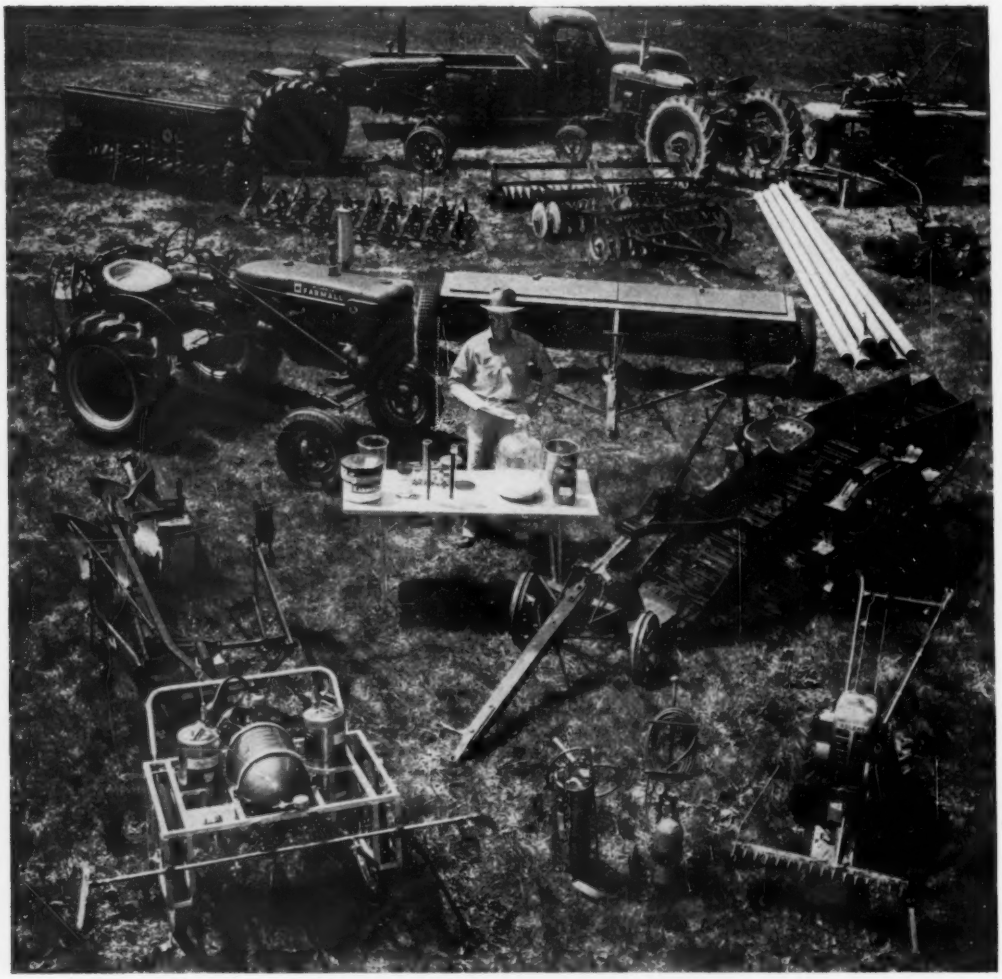
Nearly one-fifth of the nation's 10 million stockholders live in rural areas, and more than a quarter million of them are farmers and farm workers, according to a survey made by the New York Stock Exchange. In 1956, the total number of persons owning shares in publicly-held corporations reached the all-time high of 8,630,000, while an additional 1,400,000 owned shares in privately-held companies.

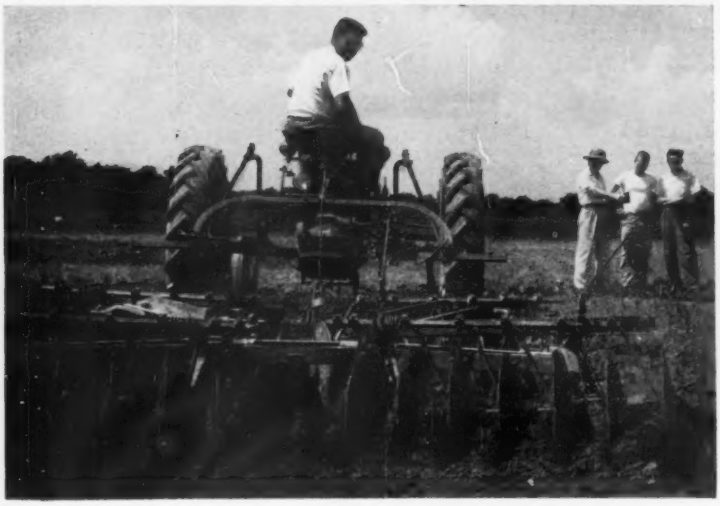
In the past four years, ownership by individuals of public corporations, through stocks, has increased by more than one third. It's interesting to note, too, that the average age of stockholders has also dropped by ten years during that time, while the average number of shares owned by an individual has increased nearly four per cent.

Nearly two-thirds of all shareowners have an income of less than $7,500 per year, and half of them less than $6,200 (as compared to $7,100 in 1952). The largest single group of owners are housewives, constituting over 34 per cent of the total, while the next largest group, clerical and sales employees, only reaches 18 per cent.

The number of individual stockholders is increasing at an average of 500,000 each year. At this rate, even if there is no increase as a result of the growing population, the number will double in 20 years. These facts underline the rapid economic changes taking place in this country and the dramatic growth of property ownership.

Du Pont, for example, has 167,331 shareholders - almost twice its number of employees. Of these 167,331 stockholders, about 85 per cent are individuals including a great many farmers. The rest are institutions - banks, investment trusts, schools and colleges, fraternal organizations, charitable groups, and insurance companies. Through these institutional stockholders, millions share indirectly in the ownership of Du Pont.





FARM EQUIPMENT costing more than $25,000 is used at Du Pont's Stine Test Farm near Newark, Delaware. Experimental rigs and devices are used by research scientists to create special conditions needed for tests.

(Right) DISC HARROW turns up soil to prepare corn plot for experiment on use of chemical weed killers. Scientists in background are planning experiment to test efficiency of new products.

NOTEBOOK FARMERS RAISE HIGHEST PRICED CROPS TO TEST NEW FARM CHEMICALS

This fall, a dozen Du Pont farm specialists have been carefully picking, checking and weighing the nation's most expensive farm crops, according to the company's employee magazine, Better Living. Peaches costing $500 a bushel and melons at $200 a dozen would startle a housewife, but they are everyday occurrences to the farm research men. They grow such crops in their efforts to evaluate the effect of agricultural chemicals just out of the test tube.

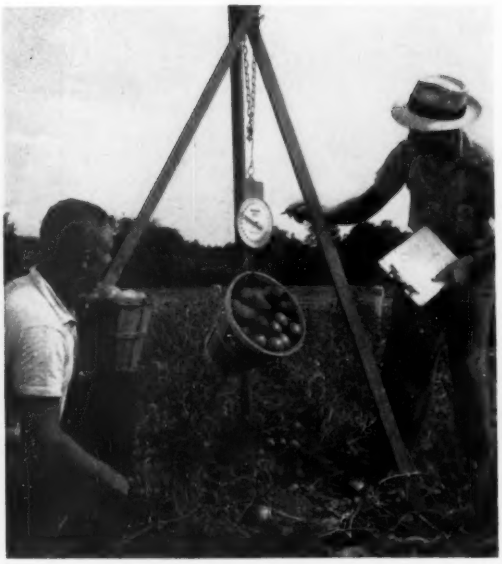
Pilot crops are now grown at three Du Pont test farms, located near Bradenton, Fla., Raleigh, N. C., and Newark, Del. There, teams of biologists and farm hands raise more than 75 acres of peaches, melons, corn, peanuts, cotton, as well as a half dozen other crops -- including, by the way, crabgrass.

The value of these harvests lies not in the pounds, bushels or bales of products grown, but rather in the pages of notebooks that are filled with the results of scientific tests. New chemicals, developed by more than 100 Du Pont technical men working in three laboratories, are put through their paces by the "notebook farmers." Each must prove itself useful in produc-

NOTEBOOK FARMER IN ACTION: Horticulturist Vernon Fisher keeps careful records on progress of apple buds at one of Du Pont Company's experimental farms (above).

Dr. Fisher reports on greenhouse experiments to farm vocational leaders, Ralph Sutliff of New York, John Snell of Maine, and Paul Hodgson of Delaware. Tour of farm was part of a recent week-long conference in Wilmington, Del., of 60 vocational agriculture administrators (left).

FOUR EARS OF CORN are grown on chemically cleared plot for each one grown in untreated, weed-filled plot. (Right) Weighing tomatoes at end of five-month experiment. Results verified laboratory discovery of new chemical for controlling diseases.



ing better crops or cheaper foods before it receives the stamp of approval of Du Pont scientists.

Normally, a half dozen years of research and an investment of $1 million in research and development will ride on a promising test-tube chemical for farm use. Greenhouse checks and full growing season farm tests at Du Pont field stations are but a prelude to later experiments at state agricultural stations.

The experimental farm is but one important step in the over-all testing process for new ideas and new farm chemicals. Many other tests are made in the laboratory, often requiring long-range research to determine such things as toxicity and side effects. Only when each of these rungs in the development ladder has been climbed, does a product reach the market.

LARGER MELONS are grown in experimental plot treated with new fungicide developed in laboratory. Smaller melons on right were grown in untreated plot.

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BETTER PEACHES in large basket were grown on trees sprayed with new insecticide. Trees on which old spray was used gave smaller basket of fruit.

METHIONINE AND LYSINE SUPPLEMENTS TO HELP REDUCE PROTEIN REQUIREMENT OF ANIMAL FEED

By Hans R. Rosenberg*
Stine Laboratory
E. I. du Pont de Nemours & Co., Inc.

Use of methionine and lysine supplements to save vast amounts of proteins in animal feed is under study in the Du Pont Company's Stine Laboratory. Results so far indicate that protein, which is the most expensive ingredient in livestock and poultry feeds, can be reduced if proper amounts of supplemental lysine and methionine are included in the diet.

Methionine and lysine are two of the amino acids which are the building blocks of proteins. Some two dozen of these amino acids go to make up the protein structure. Research work over the past 45 years has established which amino acids must be present in feed so that growing animals may thrive. A special committee of the National Research Council has published nutrient requirements of animals, including those for amino acids, of various animals.

For chicks, the NRC report established the requirement for essential amino acids at 9.25 per cent of the diet and a total protein content of 20 per cent of the diet. Thus, about one half of the protein consists of so-called non-essential amino acids. These are, of course, important from a nutritional standpoint since they provide the animal with the nitrogen needed for protein and tissue synthesis, although it is not known how much of them must be supplied as a minimum and which specific amino acids serve the growing animal with the raw materials needed to build tissue proteins.

Amino acid requirements are usually expressed as a per cent of the total diet, but recent research has indicated that nutrient requirements cannot be considered as fixed values. Since animals eat to satisfy their energy requirement, it is clear that the more energy contained in each unit of food, the lower will be the consumption for each unit of gain. This smaller amount of feed must, however, contain all the essential nutrients in adequate amounts if there is to be optimum nutrition.

Experiments with chicks at the Stine laboratory brought out the fact that energy is the controlling factor in amino acid requirement. Evidently, the methionine requirement is not constant but increases rather rapidly with increasing energy. The same principle is believed to apply to all of the essential amino acids. This has been proven experimentally in a number of

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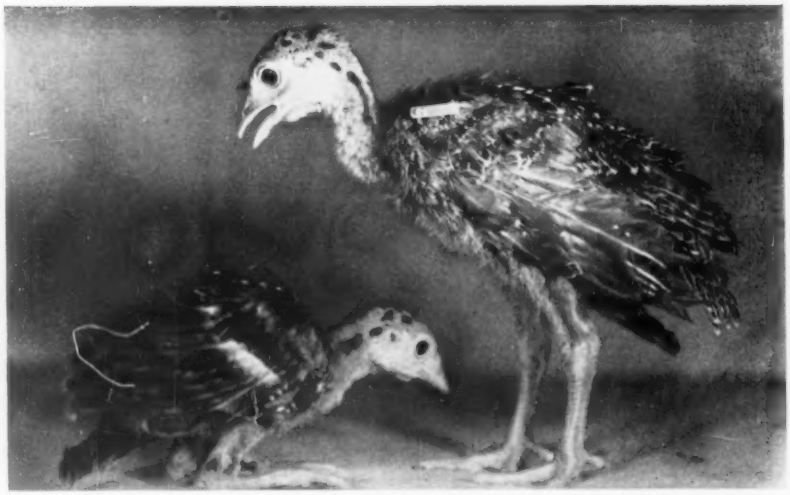
*Summary of a report presented by Dr. Rosenberg to the American Chemical Society.



PUNY POULT at left shows effect on growth of diet deficient in lysine, when compared to normal bird receiving adequate diet. Recent experiments with lysine and methionine indicate that tremendous protein savings are possible in animal feeds with use of supplemental amino acids.

instances, as in the case of lysine requirement of growing rats and chicks, as well as the methionine requirement of turkeys.

Studies were also made of the effect of changing both the protein level and the energy level on amino acid requirement. Again, the evidence points to the fact that energy is the governing factor. The experiments have confirmed earlier findings that the requirement for amino acids increased proportionately with increasing protein level -- but only when the diet contained sufficient energy to permit the animal to make full use of the protein for growth purposes. If the energy from non-protein sources is insufficient, then apparently the animal will use some of the protein to make up its energy needs.

These new concepts on the utilization of amino acids may well have a great impact on the way in which their requirement in the diet will be stated in the future. In the light of the new evidence, they cannot be expressed as a fixed percentage of the diet and a reappraisal of each amino acid will be necessary. It should be possible to state the requirements at any given energy level with considerable accuracy.

As far as is presently known, the first limiting amino acid in most mixed feeds is either methionine or lysine. The feed industry is making very extensive use of synthetic methionine. Laboratory tests, field trials, and actual operations have shown that addition of methionine to deficient diets provide improved performance and financial return to broiler growers.

Commercial development of lysine is not as far along, even though cereal foods for both humans and animals are relatively deficient in this amino acid. As production increases and the price permits large scale use of lysine, it will undoubtedly become an important ingredient in animal feeds and its use in human foods will in all likelihood be increased. Lysine has already found its way into a few specialty breads and some nutritionists feel that all bread should be so supplemented. The

trend is increasing and general benefits are expected, especially for children and older people.

We are now consuming more meat and eggs per capita than our fathers did and it is safe to assume that future generations will wish to eat at least as well as we do. Students of world population are seriously concerned with the problem of how to feed this ever increasing population. This problem is a difficult one but through research we will learn how to produce more and how to use what we have more economically. The availability of methionine and lysine and perhaps of other essential amino acids at reasonable costs will permit the saving of vast amounts of protein through proper application of the principles discussed earlier.

Research along these lines has been going on for many years. For example, turkey starter rations now contain 28-32 per cent protein. The need for this high protein level is attributed to a large extent to a specifically high requirement for lysine and methionine. It has been shown that this amount of protein can safely be reduced by almost one-third. The 20 per cent protein diet did not perform as well experimentally as the same diet containing 28 per cent protein. But when both were appropriately supplemented, the low protein diet with methionine and lysine and the high protein diet with methionine, the two diets performed equally well.

In other experiments a 16-18 per cent pig starter diet was effectively reduced to a 12-14 per cent protein level. Or a broiler diet containing only 15 per cent protein performed as well as one containing the usual 20 per cent protein. All this has been accomplished using conventional feed ingredients. In addition, in the future we might make use of many sources of protein which are not used now. Methionine and lysine will take their place alongside the vitamins as regular feed ingredients.

RISE IN FARM INCOME PREDICTED

The current farm price outlook "strongly indicates an uptrend through the next 10 months at least," according to the Federal Reserve Bank of Chicago. "Beyond that time 1957 crop conditions and Government programs will largely dominate the pictures." The Bank points out that farm output increased by 11 per cent from 1951 to 1955, and "this pressed downward on prices." In the period immediately ahead, it is predicted "that the demand for farm products will continue to expand gently" while, at the same time there will be a "likely reduction in output."

WILDLIFE MANAGEMENT CENTER IS ESTABLISHED BY REMINGTON ARMS CO.

A 2970-acre wildlife study and demonstration center has been established by the Remington Arms Company, Inc., a partly owned subsidiary of Du Pont, near Chestertown, Md. To be known as "Remington Farms," the area will be used to provide information for conservationists, farmers, and others concerned with the maintenance of America's game crop. Studies will also be directed toward land-use practices designed to help farmers manage wildlife as an important and profitable addition to the crops they already produce.

The company will actively farm the tract's tillable soil; maintain beef and dairy herds to provide means of studying first hand the farmers' problems; and, develop new methods of game crop production. Growing competition for land use, Remington pointed out, "stresses the need for intelligent land management practices wherein crop production can be combined with effective game management practices. We hope to show that this can be done with no sacrifice to the land's crop productivity and with material increase to farm game populations."

Remington Farms will be under the direction of one of the nation's leading experts in wildlife management, Dr. Joseph P. Linduska, former chief of the Branch of Game Management, U. S. Fish and Wildlife Service. Dr. Linduska, who is a native of Montana, received his education at the University of Montana and Michigan State University. He has devoted virtually his entire career to wildlife conservation, and has published more than 40 technical papers on the subject.

Wild Ducks at Remington Farms, Wild Life Study and Demonstration Center

RELIEF OF PARASITE INFECTIONS IN HUMANS IS SUGGESTED BY PREVENTIVE TREATMENT OF ANIMALS

Success of preventive treatment for worm parasite infections in farm livestock suggests opportunities for controlling pinworm and certain types of hookworm infections in humans, according to Dr. Donald C. Boughton, Du Pont Company parasitologist. Participating in a symposium of the American Society of Tropical Medicine and Hygiene on worm infections as the cause of disability and disease, Dr. Boughton pointed out that worm disease costs the nation's livestock industry over $227,000,000 annually, and the "slow drag" of mild parasite infections causes additional losses.

With cattle, treatment of light worm infections has increased profits as much as two dollars to twelve dollars per head. With hogs, an intermediate level of infection can cut a herd's production in half. In livestock, Dr. Boughton pointed out, "parasitism is essentially a disease of the herd as a whole ... it may build up in a herd or flock to the point of clinical outbreaks in much the same manner as pathogenic bacteria and viruses engender disease crises in single animals. Mild infections thus have economic significance not only because of their immediate drag on production but also as evidence of more serious trouble impending."

Dr. Boughton described the development of a preventive treatment for livestock, using small daily dosages of the drug, phenothiazine, to suppress mild infections before they can become serious. "Under pressure exerted by economic considerations," he continued, "the development of parasite control in livestock has highlighted several points of possible interest to the medical profession ... Mild parasitic infection is of greater practical significance when production is the chief consideration than when health in the usual sense is the major concern. Growth and efficiency therefore take their place alongside clinical signs and laboratory tests in the study of parasitism. Prevention plays an important role in the livestock industry....

"These might be applied to at least two non-agricultural parasitic problems, namely canine hookworm in dogs which often causes the skin ailment 'creeping eruption' or more serious conditions in children; and the 18 million human pinworm infections in North America. The possibilities of preventing these infections by small daily doses of appropriate drugs may bear investigation as the medical profession pushes further and further toward the counterpart of production efficiency in their patients -- peace of mind and happiness above and beyond mere health."

EXPERIMENTERS' NOTATIONS

A Round-up of Data from Across the Nation

Several major salt manufacturers are now offering livestock supplements containing a combination of salt and trace minerals with phenothiazine included for control of internal worms. The new products provide a simple control measure for many types of worm parasites while also furnishing the necessary salt and trace minerals. The three-way supplements can be fed free-choice to cattle, sheep and goats over six weeks of age. (They are not, however, recommended for lactating animals producing milk for market).

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Cold storage greatly improves tolerance of dormant strawberry plants to pest-controlling heat treatment, according to the USDA. Nearly all plants stored at 32°F survived immersion in water at 127°F (for control of parasitic nematodes and cyclamen mite), as compared to 40 per cent for non-stored plants.

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Discarded nylon stockings are used by Edward S. Sylvester, associate entomologist at the University of California Experimental Station, to speed experimental transmission of plant diseases. He has constructed midget cages using short sections of centrifuge tubes which are corked at one end and covered with a fine mesh of nylon at the other. Aphids, used as carriers, are placed inside the cages and the nylon covered end is fastened against a plant leaf. The aphid feeds through the nylon bars of his cell, and the experimenter knows exactly where the insect is feeding at all times. Previously, plants and aphids were confined in a cage about the size of a pound coffee can. With the new technique, 140 cages can be fastened to leaves in about 10 minutes, where it took two hours to set up the same number of tests under the old method.

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Convenient, one-hand operation in applying insecticides on small garden plots is made possible by a new squeeze-duster package for chlordane developed by Du Pont. This is the fifth squeeze-duster developed by the company. It contains six per cent chlordane, an insecticide widely used for such outdoor insects as Japanese beetle, grubs, cutworms, earwigs, mole crickets, sowbugs, centipede, slugs, snails, and leaf-cutting ants. Indoors, the product is effective against ants, roaches, waterbugs, silverfish, crickets, and spiders. Of particular interest is the fact that one squeeze of the flexible package sends the insecticide into hard-to-reach cracks and crevices.

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